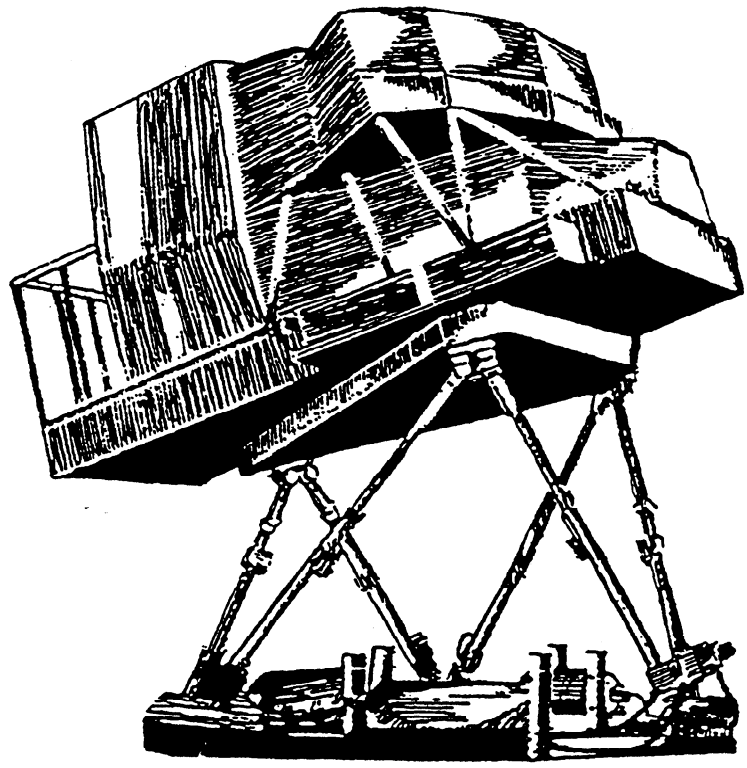
U.S. Department
of Transportation

Federal Aviation Administration

Advisory Circular

AC 120-40B
Date: 7/29/91

AIRPLANE SIMULATOR QUALIFICATION



Initiated By: ASO-205

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Subject: AIRPLANE SIMULATOR QUALIFICATION

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AC No: 120-40B **Change:**

1. PURPOSE. This advisory circular (AC) provides an acceptable means, but not the only means, of compliance with the Federal Aviation Regulations (FAR) regarding the evaluation and qualification of airplane simulators used in training programs or airmen checking under Title 14 Code of Federal Regulations (CFR). Criteria specified in this AC are those used by the Federal Aviation Administration (FAA) to determine whether a simulator is qualified and the qualification level. While these guidelines are not mandatory, they are derived from extensive FAA and industry experience in determining compliance with the pertinent FAR. Mandatory terms used in this AC such as "shall" or "must" are used only in the sense of ensuring applicability of this particular method of compliance when the acceptable method of compliance described herein is used. Applicable regulations must also be referenced to assure compliance with the provisions therein. This AC does not change regulatory requirements or create additional ones, and does not authorize changes in, or deviations from, regulatory requirements. The provisions of the FAR are controlling. This document does not interpret the regulations. Interpretations are issued only under established agency procedures. This AC applies only to the evaluation of airplane simulators. See, for example, AC 120-45, Advanced Training Devices (Airplane Only) Evaluation and Qualification.

2. CANCELLATION. AC 120-40A, Airplane Simulator and Visual System Evaluation, dated July 31, 1986, is canceled. Operators having simulator improvement or acquisition projects in progress on the effective date of this advisory circular have 90 days from the effective date to notify the National Simulator Program Manager (NSPM) of those projects which the operator desires to complete under the provisions of AC 120-40A.

3. RELATED FAR SECTIONS. FAR Part 1; FAR Sections 61.57, 61.58, and 61.157, FAR Part 61 Appendix A; FAR Section 63.39, FAR Part 63 Appendix C; FAR Sections 121.407, 121.409, 121.439, and 121.441; FAR Part 121 Appendices E, F, and H; FAR Sections 125.285, 125.287, 125.291, and 125.297; and FAR Sections 135.293, 135.297, 135.323, and 135.335.

4. RELATED READING MATERIAL. AC 120-28C, Criteria for Approval of Category III Landing Weather Minima; AC 120-29, Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators; AC 120-35B, Line Operational Simulations: Line-Oriented Flight Training, Special Purpose Operational Training, Line Operational Evaluation; AC 120-41, Criteria for Operational Approval of Airborne Wind Shear Alerting and Flight Guidance Systems; AC 120-45, Advanced Training Devices (Airplane Only) Evaluation and Qualification; AC 120-46, Use of Advanced Training Devices (Airplane Only); AC 150/5300-13, Airport Design; AC 150/5340-1F, Marking of Paved Areas on Airports; AC 150/5340-4C, Installation Details for Runway Centerline Touchdown Zone Lighting Systems; AC 150/5340-19, Taxiway Centerline Lighting System; AC 150/5340-24, Runway and Taxiway Edge Lighting System; and AC 150/5345-28D, Precision Approach Path Indicator (PAPI) Systems.

5. BACKGROUND.

a. The availability of advanced technology has permitted greater use of flight simulators for training and checking of flight crewmembers. The complexity, costs, and operating environment of modern aircraft also has encouraged broader use of advanced simulation. Simulators can provide more indepth training than can be accomplished in airplanes and provide a very high transfer of learning and behavior from the simulator to the airplane. The use of simulators, in lieu of airplanes, results in safer flight training and cost reductions for the operators. It also achieves fuel conservation and reduction in adverse environmental effects.

b. As technology progressed and the capabilities of flight simulation were recognized, FAR revisions were made to permit the increased use of simulators in approved training programs. Simulators have been used in training and some checking programs since the middle 1950's. Various FAR amendments gradually permitted additional simulator credits. The most significant recognition of simulator capability has occurred since the early 1970's. In December 1973, FAR Amendments 61-62 and 121-108 permitted additional use of visual simulators. Amendments to FAR Section 121.439 permitted simulators approved for "the landing maneuver" to be substituted for the airplane in a pilot recency of experience qualification. These changes to the FAR constituted a significant step toward the development of Amendments 61-69 and 121-161 issued June 24, 1980, which contained the FAA Advanced Simulation Plan. To support this plan, the National Simulator Evaluation Program was established by the FAA in October 1980. The program is administered and directed by the NSPM.

c. The need for standard criteria was necessitated by the use of simulators for training and checking. The evolution of the simulator technology and the concomitant increased permitted use has required a similar evolution of the criteria for simulator qualification. A listing of known simulator criteria should, therefore, be informative. The qualification basis for a given simulator may be any of the past criteria, depending on when the simulator was first approved or last upgraded. The following list provides the effective dates of simulator qualification criteria documents:

FAR Part 121, Appendix B	1/9/65 to 2/2/70
AC 121-14	12/19/69 to 2/9/76
AC 121-14A	2/9/76 to 10/16/78
AC 121-14B	10/16/78 to 8/29/80
FAR Part 121, Appendix H	6/30/80 to Present
AC 121-14C	8/29/80 to 1/31/83
AC 120-40	1/31/83 to 7/31/86
AC 120-40A	7/31/86

Each of these documents has addressed the greater complexity represented by succeeding generations of simulators. Complexity of the highest level is not, however, required of all simulators. In fact, simulators are divided into levels

that authorize additional training and checking with increased simulator capability. Until the advent of the Advanced Simulation Plan, there were two levels of simulators--nonvisual and visual. Some visual simulators were approved for "the landing maneuver." The Advanced Simulation Plan introduced three additional levels--Phase I, Phase II, and Phase III. Those visual simulators previously approved for "the landing maneuver" were incorporated into Phase I.

The training and checking credits for nonvisual and visual simulators were delineated in FAR Part 61, Appendix A, and FAR Part 121, Appendices E and F. Credits for Phases I, II, and III were contained in the Advanced Simulation Plan. Four levels of simulators were, therefore, addressed; Basic (nonvisual and visual simulators), Phase I, Phase II, and Phase III. Each of the four levels is progressively more complex than the preceding level and each contains all the features of preceding levels plus the requirements for the designated level. As the technology has advanced, so has the qualification guidance. Efforts to keep the criteria updated are, therefore, ongoing with active participation from both industry and government resources.

d. Continuing this same process, the FAA, in coordination with industry, has reviewed a wide spectrum of devices used in training in order to provide guidance on required standards and permitted uses. While recognizing the requirement to categorize and define training devices, it became obvious that the designation of simulators was outmoded. The concept of phases was no longer applicable since it derived from an FAR provision which allowed operators to upgrade their simulator inventories in phases while enjoying certain simulator use privileges. The concept of upgrade in phases is essentially complete and the designation of "phase" for identification of simulator complexity is no longer descriptive. Operators no longer begin at a lower level of qualification and upgrade in phases. The tendency is to acquire a given level simulator that best suits their position. Therefore, simulators were redesignated. The new designations and their relationships with the simulator definitions used previously and in FAR Part 121, Appendix H, are:

Level A - Visual
Level B - Phase I
Level C - Phase II
Level D - Phase III

Nonvisual simulators are now grouped with Level 6 training devices, but must meet the requirements, except for visual, of a Level A simulator. There is no other change in their characteristics or description; just their "name." Alphabetic designations were chosen for simulators to maintain a distinction from the numerically designated training devices.

6. DEFINITIONS.

a. Airplane Simulator is a full size replica of a specific type or make, model, and series airplane cockpit, including the assemblage of equipment and computer programs necessary to represent the airplane in ground and flight operations, a visual system providing an out-of-the-cockpit view, and a force

cueing system which provides cues at least equivalent to that of a three degrees-of-freedom motion system; and is in compliance with the minimum standards for Level A simulator.

b. Approval Test Guide (ATG) is a document designed to validate that the performance and handling qualities of a simulator agree within prescribed limits with those of the airplane and that all applicable regulatory requirements have been met. The ATG includes both the airplane and simulator data used to support the validation. The Master Approval Test Guide (MATG) is the FAA approved ATG and incorporates the results of FAA witnessed tests. The MATG serves as the reference for future evaluations.

c. Convertible Simulator is a simulator in which hardware and software can be changed so that the simulator becomes a replica of a different model, usually of the same type airplane. Thus, the same simulator platform, cockpit shell, motion system, visual system, computers, and necessary peripheral equipment can be used in more than one simulation.

d. Highlight Brightness is the area of maximum displayed brightness which satisfies the brightness test in appendix 1, item 4k.

e. Latency is the additional time beyond that of the basic airplane perceivable response time due to the response time of the simulator. This includes the update rate of the computer system combined with the respective time delays of the motion system, visual system or instruments.

f. NSPM is the FAA Manager responsible for the overall administration and direction of the National Simulator Evaluation Program.

g. Operator, as used in this AC, identifies the person or organization requesting FAA qualification of a simulator and is responsible for continuing qualification and liaison with the FAA.

h. Simulation Data are the various types of data used by the simulator manufacturer and the applicant to design, manufacture, and test the flight simulator. Normally, the airplane manufacturer will supply airplane data to the simulator manufacturer.

i. Simulator Evaluation Specialist is an FAA technical specialist trained to evaluate simulators and to provide expertise on matters concerning airplane simulation.

j. Snapshot is a presentation of one or more variables at a given instant of time. A snapshot is appropriate for a steady state condition in which the variables are constant with time.

k. Statement of Compliance (SOC) is a certification from the operator that specific requirements have been met. It must provide references to needed sources of information for showing compliance, rationale to explain how the

referenced material is used, mathematical equations and parameter values used, and conclusions reached.

l. Time History is a presentation of the change of a variable with respect to time. It is usually in the form of a continuous data plot over the time period of interest or a printout of test parameter values recorded at multiple constant time intervals over the time period of interest.

m. Transport Delay is the total simulator system processing time required for an input signal from a pilot primary flight control until motion system, visual system, or instrument response. It is the overall time delay incurred from signal input until output response. It does not include the characteristic delay of the airplane simulated.

n. Upgrade, for the purpose of this AC, means the improvement or enhancement of a simulator for the purpose of achieving a higher level qualification.

o. Validation Flight Test Data, for the purpose of this AC, are performance, stability and control, and other necessary test parameters electrically or electronically recorded in an airplane using a calibrated data acquisition system of sufficient resolution and verified as accurate by the company performing the test to establish a reference set of relevant parameters to which like simulator parameters can be compared. Other data, such as photographic data, may be considered acceptable flight test data after evaluation by the NSPM.

p. Visual System Response Time is the interval from an abrupt control input to the completion of the visual display scan of the first video field containing the resulting different information.

7. DISCUSSION.

a. The procedures and criteria for simulator evaluations under the National Simulator Evaluation Program are contained in this AC. A simulator, qualified by the NSPM in accordance with the guidance and standards herein, will be recommended to the operator's principal operations inspector (POI) or certificate holding district office, as appropriate, for approval for use within an operator's training program.

b. Evaluation of simulators used for training or certification of airmen under Title 14 CFR fall under the direction of the National Simulator Evaluation Program. A simulator will be evaluated under the provisions of this AC if it is used in a training program approved under FAR Parts 63, 121, 125, or 135; or if it is used by an operator in the course of conducting the Pilot-in-command proficiency check required by FAR Section 61.58 or the issuance of an airline transport pilot certificate or type rating in accordance with the provisions of FAR Section 61.157.

c. Under the National Simulator Evaluation Program concept, a simulator is evaluated for a specific operator by an FAA Simulator Evaluation Specialist. Based on a successful evaluation, the NSPM will certify that the simulator meets the criteria of a specific level of qualification. Upon qualification by the NSPM, approval for use of the simulator in a particular training program will be determined by the POI in the case of FAR Parts 63, 121, 125, or 135 certificate holders or by the Flight Standards District Office (FSDO) responsible for oversight of a training center when the training center is using the simulator to conduct checks required by FAR Part 61.

d. FAA evaluations of simulators located outside the United States will be performed if such simulators are being used by a U.S. operator to train or certificate U.S. airmen. Evaluations may be conducted otherwise as deemed appropriate by the Administrator on a case-by-case basis.

e. Operators who contract to use simulators already qualified and approved at a particular level for an airplane type are not subject to the qualification process. However, they are required to obtain FAA approval to use the simulator in their approved training programs.

8. EVALUATION POLICY.

a. The methods, procedures, and standards defined in this AC provide one means, acceptable to the Administrator, to evaluate and qualify a simulator. If an applicant desires to use another means, a proposal must be submitted to the NSPM for review and approval prior to the submittal of a detailed ATG. If an applicant chooses to utilize the approach described in this AC, the applicant must adhere to all of the methods, procedures, and standards herein.

b. The simulator must be assessed in those areas which are essential to completing the airman training and checking process. This includes the simulator's longitudinal and lateral-directional responses; performance in takeoff, climb, cruise, descent, approach, and landing; control checks; cockpit, flight engineer, and instructor station functions checks; and certain additional requirements depending upon the complexity or qualification level of the simulator. The motion system and visual system will be evaluated to ensure their proper operation.

c. The intent is to evaluate the simulator as objectively as possible. Pilot acceptance, however, is also an important consideration. Therefore, the simulator will be subjected to validation tests listed in appendix 2 of this AC and the functions and subjective tests from appendix 3. These tests include a qualitative assessment of the simulator by an FAA pilot who is qualified in the respective airplane. Validation tests are used to compare objectively simulator and airplane data to assure that they agree within specified tolerances. Functions tests provide a basis for evaluating simulator capability to perform over a typical training period and to verify correct operation of the simulator controls, instruments, and systems.

d. Tolerances, listed for parameters in appendix 2, should not be confused with design tolerances specified for simulator manufacture. Tolerances for the parameters listed in appendix 2 are the maximum acceptable to the Administrator for simulator validation.

e. A convertible simulator will be addressed as a separate simulator for each model and series to which it will be converted and FAA qualification sought. An FAA evaluation is required for each configuration. For example, if an operator seeks qualification for two models of an airplane type using a convertible simulator, two ATG's or a supplemented ATG, and two evaluations are required.

f. For airplanes issued an original type certificate after June 1980 or for significant amendments to an original type certificate, or for a supplemental type certificate which would result in handling qualities or performance changes, only manufacturer's flight test data will be accepted for initial qualification. Exceptions to this policy must be submitted to the NSPM for review and consideration. It is the intent of the FAA that all tests listed in this AC be applied to simulator qualification. However, for airplanes which were type certificated, their flight tests completed and data released before the issuance of this AC, the NSPM will consider the use of alternative data from the airplane manufacturer. For older airplanes, particularly those certificated before June 1980, additional flight testing may be necessary. For a new type or model of airplane, predicted data validated by flight test data, which has not received final approval by the manufacturer, can be used for an interim period as determined by the FAA. In the event that predicted data are used in programming the simulator, it should be updated as soon as practicable when actual airplane flight test data become available. Unless specific conditions warrant otherwise, simulator programming should be updated within 6 months after release of the final flight test data package by the airplane manufacturer.

g. If a problem with a validation test result is detected by the FAA Simulator Evaluation Specialist, the test may be repeated. If it still does not meet the test tolerance, the operator may demonstrate alternative test results which relate to the test in question. In the event a validation test(s) does not meet specified criteria, but the criteria is not considered critical to the level of evaluation being conducted, the NSPM may conditionally qualify the simulator at that level. The operator will be given a specified period of time to correct the problem and submit the ATG changes to the NSPM for evaluation. Alternatively, if it is determined that the results of a validation test would have a detrimental effect on the level of qualification being sought or is a firm regulatory requirement, the NSPM may qualify the simulator to a lesser level or restrict maneuvers based upon the evaluation completed. For example, if a Level D evaluation is requested and the simulator fails to meet landing test tolerances, it could be qualified at Level A.

h. Evaluation dates will not be established until the ATG has been reviewed by the NSPM and determined to be acceptable. Within 10 working days of receiving an acceptable ATG, the NSPM will coordinate with the operator and

POI to set a mutually acceptable date for the evaluation. To avoid unnecessary delays, operators are encouraged to work closely with the NSPM during the ATG development process prior to making formal application.

i. At the discretion of the FAA Simulator Evaluation Specialist, the operator's pilots may assist in completing the functions and validation tests during evaluations. However, only FAA personnel should manipulate the pilot controls during the functions check portion of an FAA evaluation.

9. INITIAL OR UPGRADE EVALUATIONS.

a. An operator seeking simulator initial or upgrade evaluation must submit a request in writing to the NSPM through the POI or responsible FAA FSDO. This request should contain a compliance statement certifying that the simulator meets all of the provisions of this AC, that the cockpit configuration conforms to that of the airplane, that specific hardware and software configuration control procedures have been established, and that the pilot(s) designated by the operator confirm that it is representative of the airplane in all functions test areas. A sample letter of request is included in appendix 4.

b. The operator should submit an ATG which includes:

(1) A title page with the operator and FAA approval signature blocks.

(2) A simulator information page, for each configuration in the case of convertible simulators, providing:

(i) The operator's simulator identification number or code.
(ii) Airplane model and series being simulated.
(iii) Aerodynamic data revision.
(iv) Engine model and its data revision.
(v) Flight control data revision.
(vi) Flight Management System identification and revision level.
(vii) Simulator model and manufacturer.
(viii) Date of simulator manufacture.
(ix) Simulator computer identification.
(x) Visual system model and manufacturer.
(xi) Motion system type and manufacturer.

(3) Table of contents.

(4) Log of revision and/or list of effective pages.

(5) Listing of all reference source data.

(6) Glossary of terms and symbols used.

(7) SOC with certain requirements. SOC's must provide references to sources of information for showing compliance, rationale to explain how the referenced material is used, mathematical equations and parameter values used, and conclusions reached. Refer to appendix 1, "Simulator Standards," comments column, for SOC requirements.

(8) Recording procedures or required equipment for the validation tests.

(9) The following for each validation test designated in appendix 2 of this AC:

(i) Name of the test.
(ii) Objective of the test.
(iii) Initial conditions.
(iv) Manual test procedures.
(v) Automatic test procedures (if applicable).
(vi) Method for evaluating simulator validation test results.
(vii) Tolerances for relevant parameters.
(viii) Source of Airplane Test Data (document and page number).
(ix) Copy of Airplane Test Data.
(x) Simulator Validation Test Results as obtained by the operator.
(xi) A means, acceptable to the NSPM, of easily comparing the simulator test results to airplane test data.

c. The operator's simulator test results must be recorded on a multichannel recorder, line printer, or other appropriate recording media acceptable to the NSPM. Simulator results should be labeled using terminology common to airplane parameters as opposed to computer software identifications. These results should be easily compared with the supporting data by employing cross-plotting, overlays, transparencies, or other acceptable means. Airplane data documents included in an ATG may be photographically reduced only if such reduction will not alter the graphic scaling or cause difficulties in scale interpretation or resolution. Incremental scales on graphical presentations must provide the resolution necessary for evaluation of the parameters shown in appendix 2. The test guide will provide the documented proof of compliance with the simulator validation tests in appendix 2. In the case of a simulator upgrade, an operator should run all validation tests for the requested qualification level. Validation test results offered in a test guide for a previous initial or upgrade evaluation should not be used to validate simulator performance in a test guide offered for a current upgrade. For tests involving time histories, flight test data sheets, or transparencies thereof, and simulator test results should be clearly marked with appropriate reference points to ensure an accurate comparison between simulator and airplane with respect to time. Operators using line printers to record time histories should clearly mark that information taken from the line printer data output for cross-plotting on the airplane data. The cross-plotting of the operator's simulator data to airplane

data is essential to verify simulator performance in each test. During an evaluation, the FAA will devote its time to detailed checking of selected tests from the ATG. The FAA evaluation serves to validate the operator's simulator test results.

d. The completed ATG and the operator's compliance letter and request for the evaluation will be submitted through the operator's POI. The POI will then submit the total package with a letter or memorandum of endorsement to the NSPM. The ATG will be reviewed and determined to be acceptable prior to scheduling an evaluation of the simulator.

e. A copy of an ATG for each type simulator by each simulator manufacturer will be required for the NSPM's file. The NSPM may elect not to retain copies of the ATG for subsequent simulators of the same type by a particular manufacturer, but will determine the need for copies on a case-by-case basis. Data updates to an original ATG should be provided to the NSPM in order to keep FAA file copies current.

f. The operator may elect to accomplish the ATG validation tests while the simulator is at the manufacturer's facility. Tests at the manufacturer's facility should be accomplished at the latest practical time prior to disassembly and shipment. The operator must then validate simulator performance at the final location by repeating at least one-third of the validation tests in the ATG and submitting those tests to the NSPM. After review of these tests, the FAA will schedule an initial evaluation. The ATG must be clearly annotated to indicate when and where each test was accomplished.

g. In the event an operator moves a simulator to a new location and its level of qualification is not changed, the following procedures shall apply:

(1) Advise the POI and NSPM of the move.

(2) Prior to returning the simulator to service at the new location, the operator should perform a typical recurrent validation and functions test. The results of such tests will be retained by the operator and be available for inspection by the FAA at the next evaluation or as requested.

(3) The NSPM may schedule an evaluation prior to return to service.

h. When there is a change of operator, the new operator must accomplish all required administrative procedures including the submission of the currently approved Master Approval Test Guide (MATG) through the POI to the NSPM. The ATG must be identified with the new operator by displaying the operator's name or logo. The POI will then submit the package as described in paragraph 8d above. The simulator may, at the discretion of the NSPM, be subject to an evaluation in accordance with the original qualification criteria. However, a simulator having Phase I status resulting from a landing maneuver approval under AC 121-14B must meet the Phase I requirements in FAR Part 121, Appendix H, in the event of the sale or transfer of the simulator from one operator to another.

i. The scheduling priority for initial and upgrade evaluations will be based on the sequence in which acceptable ATG's and evaluation requests are received by the NSPM.

j. The ATG will be approved after the completion of the initial or upgrade evaluation and all discrepancies in the ATG have been corrected. This document, after inclusion of the FAA witnessed test results, becomes the MATG. The MATG will then remain in the custody of the operator for use in future recurrent evaluations.

10. RECURRENT EVALUATIONS.

a. For a simulator to retain its qualification, it will be evaluated on a recurrent basis using the approved MATG. Unless otherwise determined by the NSPM, recurring evaluations will be accomplished every 4 months by a Simulator Evaluation Specialist. Each recurrent evaluation, normally scheduled for 8 hours of simulator time, will consist of functions tests and approximately one-third of the validation tests in the MATG. The MATG is to be completed annually.

b. Dates of recurrent evaluations will normally not be scheduled beyond 30 days of the date due. Exceptions to this policy will be considered by the NSPM on a case-by-case basis to address extenuating circumstances.

c. In the interest of conserving simulator time, the following Optional Test Program (OTP) is an alternative to the 8-hour recurrent evaluation procedure:

(1) Operators of simulators having the appropriate automatic recording and plotting capabilities may apply for evaluation under the OTP.

(2) Operators must notify the NSPM in writing of their intent to enter the OTP. If the FAA determines that the evaluation can be accommodated with 4 hours or less of simulator time, recurrent evaluations for that simulator will be planned for 4 hours. If the 4-hour period is or will be exceeded and the operator cannot extend the period, then the evaluation will be terminated and must be completed within 30 days to maintain qualification status. The FAA will then reassess the appropriateness of the OTP.

(3) Under the OTP, at least one-third of all the validation tests will be performed and certified by operator personnel between FAA recurrent evaluations. Complete coverage will be required through any three consecutive recurrent evaluations. These tests and results will be reviewed by the FAA Simulator Evaluation Specialist at the outset of each evaluation. The one-third of validation tests executed for each recurrent evaluation should be accomplished within the 30 days prior to the scheduled evaluation or accomplished on an evenly distributed basis during the 4-month period preceding the scheduled evaluation. Twenty percent of those tests conducted by the operator for each recurrent evaluation will then be selected and repeated by the Simulator Evaluation Specialist along with 10 percent of those tests not performed by the operator.

d. With appropriate arrangement and understanding between the operator and FAA, an extended interval recurrent evaluation schedule based on semiannual FAA inspections can be arranged. The extended interval evaluation schedule relies on quarterly checks by the operator.

e. Prior to arrival for an on-site evaluation, the FAA inspector will notify the operator if any tests are planned to be run that may require special equipment or technicians. These tests would include latencies, control dynamics, sounds and vibrations, or motion system tests.

f. In instances where an operator plans to remove a simulator from active status for prolonged periods, the following procedures shall apply to requalify the simulator pursuant to this AC:

(1) The NSPM and POI shall be advised in writing. The notice shall contain an estimate of the period that the simulator will be inactive.

(2) Recurrent evaluations will not be scheduled during the inactive period. The NSPM will remove the simulator from qualified status on a mutually established date not later than the date on which the first missed recurrent evaluation would have been scheduled.

(3) Before a simulator can be restored to FAA qualified status, it will require an evaluation by the NSPM. The evaluation content and time required for accomplishment will be based on the number of recurrent evaluations missed during the inactive period. For example, if the simulator were out of service for 1 year, it would be necessary to complete the entire test guide since under the recurrent evaluation program, the MATG is to be completed annually.

(4) The operator will notify the NSPM of any changes to the original scheduled time out of service.

(5) The simulator will normally be requalified using the FAA-approved MATG and criteria that was in effect prior to its removal from qualification; however, inactive periods exceeding 1 year will require a review of the qualification basis and, if conditions warrant, may require the establishment of a new qualification basis.

11. SPECIAL EVALUATIONS.

a. Between recurring evaluations, if deficiencies are discovered or it becomes apparent that the simulator is not being maintained to initial qualification standards, a special evaluation of the simulator may be conducted by the NSPM to verify its status.

b. The simulator will lose its qualification when the NSPM can no longer ascertain maintenance of the original simulator validation criteria based on a recurrent or special evaluation. Additionally, the POI shall advise the operator and the NSPM if a deficiency is jeopardizing training requirements, and arrangements shall be made to resolve the deficiency in the most effective manner, including the withdrawal of approval by the POI.

12. MODIFICATION OF SIMULATORS, MOTION SYSTEMS, AND VISUAL SYSTEMS.

a. In accordance with FAR Part 121, Appendix H, operators must notify the POI and NSPM at least 21 days prior to making software program or hardware changes which might impact flight or ground dynamics of a simulator. A complete list of these planned changes, including dynamics related to the motion and visual systems and any necessary updates to the MATG, must be provided in writing. Operators should maintain a configuration control system to ensure the continued integrity of the simulator as qualified. The configuration control system may be examined by the FAA on request.

b. Modifications which impact flight or ground dynamics, systems functions, and significant ATG revisions may require an FAA evaluation of the simulator.

13. SIMULATOR QUALIFICATION BASIS. The FAR require that simulators must maintain their approved performance, functions, and other characteristics. Except as provided in paragraph 2, all initial upgrade and recurrent evaluations of those simulators initially qualified according to the acceptable methods of compliance described herein will be conducted in accordance with the provisions of this AC. Simulators approved prior to this AC will continue to maintain their current qualification as long as they meet the standards under which they were originally approved, regardless of operator, except as noted in paragraph 9h. Any simulator upgraded to Level B, C, or D standards or any visual system or motion system upgrade requires an initial evaluation of that simulator, visual system, or motion system in accordance with the provisions herein.

William J. White
Acting Director, Flight Standards Service